It is notable as well that 23 of 39 firms responding reported "no unmet communications needs" from their cellular providers; with 8 requesting better data handling capabilities; 6 citing the need for more cellular coverage; and 2 expressing concerns for weather-related interruptions.[25]

Demand growth seems to be tied to the growth and prosperity of the oil industry in the GMSA. There is no clear indication of any other forces there that might lead to new uses of wireless services. Growth is limited, therefore, by the growth of the oil and gas industry and the extent to which it substitutes wireless services for other inputs. PetroCom estimates the annual growth in the 5% range.[26]

Performance of Firms in the GMSA Wireless Telecom Market. So far as we can determine there is no publicly available study of carrier performance in the GMSA more recent than the Spear Study cited above. However, we look forward to testing the following tentative conclusions drawn from that study against the results of more recent demand studies undertaken in response to the Commission's solicitation. Pending analysis of those, we are left to rely on the Spear Study and its implications that: prices are reasonable; services are consistent with technological constraints and the unique character of the Gulf marketplace; firms are generally responsive to market signals and changing user needs; and, there are no indications of anticompetitive behavior.

The performance in this market seems to conform generally with the requirements of workable competition. The information from the Spears study reported above, while old, indicates no basis for inferring the exercise of monopoly power, or firm dominance, in the GMSA. Moreover, the information summarized from the S-1 filed by IWL with the Securities and Exchange Commission indicates the operation of robustly competitive and risky marketplace.[27]

The cellular companies operating in the Gulf are privately held, so profit and loss information is not publicly available. However, my best estimate is that the gross margins of the two operators are comparable to the experience of small, onshore cellular operations.[28] It is notable that one of the companies, Coastel, was run by a trustee for five years, pending its sale and reorganization. The company was recently sold to a venture capitalist and has enjoyed a significant infusion of cash. But, after two years, the company has probably not reached positive cash flow.[29]

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[25] Id., p. 11.

[26] Personal Communication with PetroCom Management.

[27] See footnote 22 above. Unfortunately the neither the cellular companies, nor the other commercial microwave or diversified companies operating in the Gulf are publically traded or otherwise obliged to publicize operating data for the region.

[28] Letter to Larry F. Darby, Darby Associates, from John Payne, President of Petroleum Communications (July 1, 1997)

[29] Id.

We look to the market studies of others to corroborate further that performance in this market reflects workable competition.

EFFECTS OF LICENSING ADDITIONAL POTENTIAL ENTRANTS

Based on the limited information available, the foregoing analysis of the structure, conduct and performance of the market for wireless communications in the GMSA has resulted in market conditions consistent generally with the requirements of a workably competitive marketplace disciplined by both actual competition among incumbents and potential competition from holders of wireless licenses that may be put into service in the future.

We hasten to concede, however, that neither the theoretical SCP framework, nor the data available to estimate the SCP characteristics, is sufficiently robust to support a categorical finding of the sufficiency of existing market forces.

While market forces may very well be working well, there remains the question of whether and to what extent licensing additional carriers in the area may and will improve economic performance of the market there.

The intuitive model of the impact of increasing the number of licensees is straightforward. The reasoning is that an increase in the number of potential entrants will further discipline incumbents by increasing the prospects (probability) that the exercise by incumbents of any residual market power will attract entry and increase actual competition in the marketplace. The increased risk of entry will, according to our intuition, discipline incumbents further and diminish the probability of higher than normal rates or, alternatively, reduce the entry limiting price.[30]

Notwithstanding the simplicity and commonsense appeal of the intuitive model and its conclusion that more potential entry is preferred to less, there is no support for that expectation in the recent economics literature on the matter. One comprehensive review of entry barriers and market performance recently concluded as follows:

> Economic analysis of entry barriers is motivated by the search for structural factors that undermine market performance, and the discussion of various determinants of mobility barriers in this chapter may suggest a causality that runs from barrier to an impediment to

[30] This intuitive model is incorporated in a broader discussion of the effect of entry conditions in Richard J. Gilbert, "Mobility Barriers and the Value of Incumbency", Handbook of Industrial Organization, v. 1, Richard Schmalansee and Robert Willig, eds. (North Holland: Elsevier Science Publishers B.V., 1989), especially pp. 485-493; Section on "Behavior in the Theory of Limit Pricing".

> market efficiency. But, that would be a mistaken conclusion.[31]

Following a summary discussion of the circumstances under which increasing entry might not improve economic performance, the reviewer concludes further that:

> Welfare judgments as to the effects of mobility barriers in actual markets are difficult to make because actual markets inevitably operate in a region of second best and any attempt to improve market performance must recognize the imperfections of market intervention.[32]

Thus, as appealing as the intuitive model is, and the relation it suggests between increases in entry and changes in economic performance, contemporary economic analysis suggests a variety of circumstances under which an increase in the number of firms may not increase welfare and, indeed, may be expected to reduce it.

Under the logic of the so-called "excess entry theory" increasing the number of competitors -- and by extension the number of potential competitors -- does not always equate to better competitive results.[33]

And, there are circumstances under which increasing the number of potential entrants can actually discourage entry. The logic is straightforward. If there is only one potential entrant into a market, the managers of that firm need only to appraise existing conditions in the marketplace as they may influence the payoff to various forms of entry and the possible responses to entry by the incumbents with which it expects to compete. (By assumption, the sole potential entrant need not concern itself with the activities and potential reactions of other entrants.) A frequent specification

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[31] Gilbert, "Mobility Barriers and Value of Incumbency", p. 528.

[32] Id.

[33] There are numerous articles on this point and we make no attempt to either cite them all or even review and summarize the main ones. Mankiw and Whinston explore selected circumstances under which encouraging entry and new entrants may not lead to improvements in economic welfare. They note: "Economists typically presume that free entry is desirable for social efficiency. As several articles have shown, however, when firms must incur fixed set-up costs upon entry, the number of firms entering a market need not equal the socially desirable number. They focus on set-up costs, the degree of product differentiation and the number of potential entrants as instrumental variables. See, N. Gregory Mankiw and Michael D. Whinston, "Free Entry and Social Inefficiency", Rand Journal of Economics, v. 17, No. 1, Spring 1996 and articles cited there. See also Christian C. von Weizacker, "A Welfare Analysis of Barriers to Entry, Bell Journal of Economics, v. 11, 1980, pp. 399-420 (The long-run Cournot equilibrium number of firms may exceed the socially optimal number of firms); Martin K. Perry, "Scale Economies, Imperfect Competition and Public Policy", Journal Of Industrial Economics, v. 32 (1984), pp. 313-330. See also Konishi, Hideki; Okuno-Fujiwara, Masahiro; and Suzumura, Kotaro, Oligopolistic Competition and Economic Welfare", Journal of Public Economics, June 1990, v. 42, pp. 67-88. The latter two articles raise and address a variety of questions about the positive and negative impacts on economic welfare of liberal(ized) entry conditions.

for modeling such conditions is to assume that the entrant expects "existing firms to adopt the policy most unfavorable to them [the entering firm], namely, the policy of maintaining output while reducing price to the extent necessary to support the constant level of output."[34]

Sherman and Willett expanded the analysis of impact on entry of the expected reaction of incumbents to incorporate as well the reaction of a given potential entrant to the existence and number of other potential entrants. They observed that the decision for a potential entrant is complicated more or less in proportion to the number of potential entrants, because the outcomes from a given entrant's actions are no longer certain. Each potential entrant's profit depends on the response of existing firms but also on when, whether and how other firms enter as well.[35]

In describing their analysis of the effect of expanding the number of potential entrants Sherman and Willett argue that concern on the part of each potential entrant about possible entry by others will raise the price that can forestall entry, even though there is some question about whether existing firms will take advantage of that fact. They conclude:

> That an increase in the number of potential entrants can raise rather than lower the entry-preventing price conflicts with the widespread view that entry should be kept open to as many firms as possible.[36]

The precise relationship between the number of entrants and the entry forestalling price (that price just low enough not to induce entry) depends on the strategies and decision rules adopted by potential entrants. Sherman and Willet show different outcomes contingent on "minimax", "maximax" and "maximin" strategies of entrants. One such strategy assumes the most malevolent opponent and seeks a best response to the opponents' most harmful action. Such a course of action will maximize the entrant's minimum gain ("maximin" strategy) for whatever course of action opponents choose. It is notable that in this case the entry forestalling price is a monotonically increasing function of the number of potential entrants. More potential entry leads to generation of less economic welfare -- a result that is just the opposite to the intuitive model.

The purpose of reviewing these recent models of the effects of market entry; of lowering

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[34] For a discussion of this and alternative assumptions about the possible reactions of incumbents to new entry, see Franco Modigliani, "New Developments on the Oligopoly Front", Journal of Political Economy, LXVI, (June, 1958), p. 217. It is notable that this assumption about the reaction of incumbents is the least favorable from the point of view of the new entrant, for it implies the most aggressive, reasonable behavior by incumbents. These and related results are discussed in the literature as implications of what is called the Bain--Sylos-Labini-Modigliani (BSM) model of limit pricing. See, Gilbert, Mobility Barriers and the Value of Incumbency, pp. 480-485 for a tidy discussion of the model. .

[35] Roger Sherman and Thomas D. Willett, "Potential Entrants Discourage Entry", Journal of Political Economy , v. 75 August, 1967, pp. 400-403.

[36] Id. p. 403.

entry barriers; and, of increasing the number of potential entrants is to emphasize that the results of licensing additional wireless competitors in the GMSA cannot be accurately predicted by casual reference to simple intuitive models of the relationship of entry and performance. Without some considerable inquiry and analysis of the idiosyncratic circumstances of a particular market, we simply cannot predict the effects of changing conditions of entry. A recent reviewer of the enormous range of theoretical models of oligopolistic firm behavior concluded:

> ...the scope for oligopolistic interactions is so wide that a predictive model of how firms may behave may be no easier to construct than a model of the weather based on the formation of water droplets."[37]

Supporting further the conclusion of the indeterminacy of market performance from changing structure, Shapiro calls attention to the wide variety of theories and concludes that:

> What we are most in need of now are further empirical tests of the validity of these various theories of strategic behavior [in oligopolistic markets]."[38]

How will the prospects of new wireless entry into the GMSA influence the performance of incumbent carriers there? Several outcomes are possible, as indicated by the foregoing discussion, and none is assured. It is of consequence, for the resolution of questions about licensing new entry into the GMSA, that negative welfare impact scenarios are consistent with the literature on the relation of liberal(ized) entry and the conduct and performance of firms in oligopolistic markets.

CONCLUDING OBSERVATIONS

The foregoing has attempted to bring to bear available, but admittedly sparse, market data and generally accepted economic theories of industrial organization and competition policy on the question of whether licensing additional PCS carriers in the GMSA is consistent with the Commission's's competition policies and the public interest more generally.

The Commission posed the question in terms of the sufficiency of demand to warrant issuing additional licenses and we have construed that as an inquiry into the effectiveness and sufficiency of market forces currently at play in the GMSA to serve the interests of users.

Using the structure-conduct-performance framework for determining the effectiveness of

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[37] Gilbert, "Mobility Barriers and the Power of Incumbency", p. 478.

[38] Carl Shapiro, "Theories of Oligopoly Behavior", Handbook of Industrial Organization, v. 1, Richard Schmalansee and Robert Willig, eds. (North Holland: Elsevier Science Publishers B.V., 1989), p. 409, note 20.

competition as it has materialized in the Gulf, and the available data, we conclude generally that the market appears to be working effectively -- not perfectly, but effectively. There are several sellers providing differentiated, but at least partially substitutable, wireless services in the area. Entry is not barricaded by either regulatory or economic factors, so that potential entry does now combine with rivalry among incumbents to provide at least some additional discipline on the behavior of incumbents. The available evidence on market conduct suggests no basis for suspecting collusive, predatory, monopolistic or other anticompetitive behavior by incumbents.

According to the most recent evidence available, users report their impressions of the conduct of the major cellular provider in the region in ways consistent with, and otherwise supportive of, the general requirements and conditions associated with economic models of workable competition. While public information is sparse, owing to the private character of incumbent firms serving the area, the performance of carriers in the GMSA appears to be consistent with the general requirements of efficient resource use and allocation. Our limited knowledge of profit margins indicates that they are well within the permissible bounds established by the operating experience of comparable onshore wireless service providers.

The impact on performance of the market in the GMSA of licensing additional carriers cannot be determined. The reason is less a deficiency of data, although that is a constraint (that may be remedied by responses to the Commission solicitation for demand studies), than a deficiency in economic models of markets with a small number of firms. The indeterminacy of these models is well known and widely documented.

The cellular market in the GMSA is supplied by two firms (PetroCom and Coastel), neither of which is making supernormal returns and one of which has been undercapitalized until recently and is still not cash flow positive. An increase in the prospect for entry and/or subsequent new entry may reduce the viability of the marginal cellular carrier (Coastel) and lead to market dominance of the other (PetroCom). Or, it may reduce the incentive of PetroCom to assume the added risk occasioned by the prospect of new entrants and proceed with plans to invest and grow in the sector. Or, it may pressure PetroCom to become more aggressive and thereby hasten the demise of its cellular competitor, thereby increasing its market power and giving it power to raise prices. Or, it may lead both carriers to accelerate investment programs and lower prices as a means of deterring entry of newly licensed carriers. Or, new licensees may find, as others before them have, that they cannot obtain construction financing so that the net effect of liberalizing new entry is simply to increase the risk of incumbents and current licensees. All of these outcomes are possible, but none can be predicted with any confidence.

This uncertainty about the outcome of issuing new licenses suggests that the Commission should continue to insist, as a condition of going forward, that proponents document that markets are not now working in the GMSA; and, that clear and substantial advantages are not only possible, but likely, from adding new licensees. Absent such a showing, the expected value of doing so is at best modest and could, according to economic theory, very well be negative.

Appendix A

Competition in Wireless Telecom Services in the Gulf of Mexico

Darby Associates -- Washington, DC

Excerpts from Spear Study of Communications Markets in the Gulf of Mexico

THE OFFSHORE GULF COMMUNICATIONS MARKET IN THE PETROLEUM INDUSTRY

VOLUME I

Study made for
PETROCOM
February, 1990

by
Spears & Associates
Tulsa, Oklahoma

Introduction

At the request of Petrocom Offshore Cellular Service, Spears and Associates had conducted this survey of the petroleum industry's offshore Gulf of Mexico communications market during January and February, 1990.

The central goal of the study was to provide Petrocom management with background information needed to prepare an effective business strategy for further penetrating the offshore market. This report does not purport to provide Petrocom with a business strategy, although a list of "priorities" has been prepared for your consideration. Petrocom's management group will no doubt gain insights and see business opportunities growing out of the research that are not evident to this research group.

Specific objectives of the study were to quantify the market and measure cellular's penetration, identify factors in the buying influence and assess cellulars strength/weakness on these factors. Finally, the study serves as a basis for critically evaluating Petrocom's reputation in the offshore petroleum industry and a guide for meeting customer needs.

The study is based on a combination of personal and telephone interviews with key persons who hold direct influence over the use and/or selection of communications systems in 21 producing firms and 24 service sector firms. Dual interviews were made in many firms at corporate and field levels.

In addition, incomplete interviews were made by telephone with 25 additional service sector firms whose use of offshore communications systems is almost nonexistent, limited to 2-way radio, or is only use of communications systems supplied by the oil producers (called piggy backing).

Interviews with field level offices of producer firms collectively account for 28% of all offshore production platforms. Completed interviews were made with four drilling contractors who own 21% of the industry's active mobile rigs. An additional 14 drilling contractors were contacted but found to have little or no first-hand experience (or interest) in offshore communications systems (other than 2-way radio). Nine service sector firms were also found to have little or no interest in spending money for their own offshore

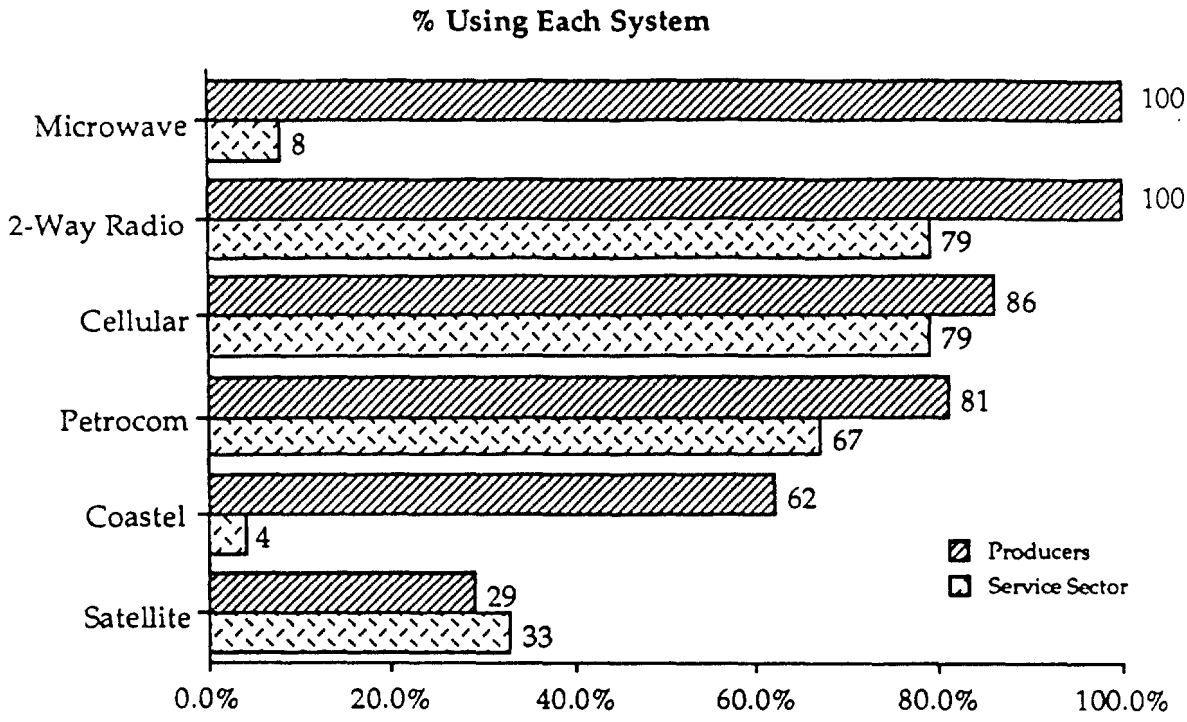
communications systems. Ordinarily they rely on access to the producers' offshore system.

Throughout the report different segments of the market are identified. "Producers" include major and independent oil and gas producers and pipelines. The term "service sector" is used to describe those firms engaged in construction (who operate construction barges), contract drilling, seismic, supply boats, and services (engaged in providing tools, equipment and services such as logging, cementing, etc.).

The report is divided into sections as follows:

GRAPHIC SECTION

OFFSHORE COMMUNICATIONS SYSTEMS NOW BEING USED



	By Producer Firms		By Service Sector	
	Number of Firms			
	Users	Base	Users	Base
Microwave	21	21	5	24
2-Way Radios	21	21	19	24
Cellular	18	21	19	24
Petrocom	17	18	16	19
Coastel	13	18	1	19
Satellite	6	21	8	24

Note: Systems in this exhibit does not address volume of traffic.

WHAT EACH TYPE COMMUNICATIONS SYSTEM IS BEING USED ON

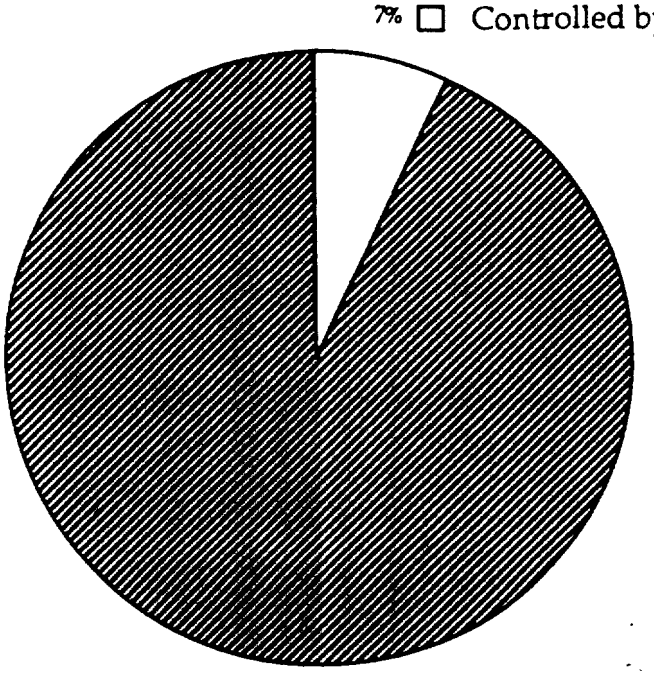
	Microwave	2-Way Radio	Cellular	Satellite
		Cumulative Number*		
Production Platforms	724	444	25	--
Platform Drilling Rigs	14	61	18	--
Mobile Drilling Rigs	17	36	79	12
Seismic Boats	--	45	56	51
Supply Boats	--	392	28	--
Construction Barges	--	9	25	--
Service Crews	12	12	1	12

* Cumulative number reported by firms in survey sample. Some respondents did not have an accurate answer, especially for 2-way radio, cellular, and satellite systems.

Note: Survey procedures allow the possibility of double counting, i.e. 2-way radio is found on many platforms served by microwave.

OFFSHORE COMMUNICATIONS TRAFFIC: (NOT COUNTING 2-WAY RADIO)

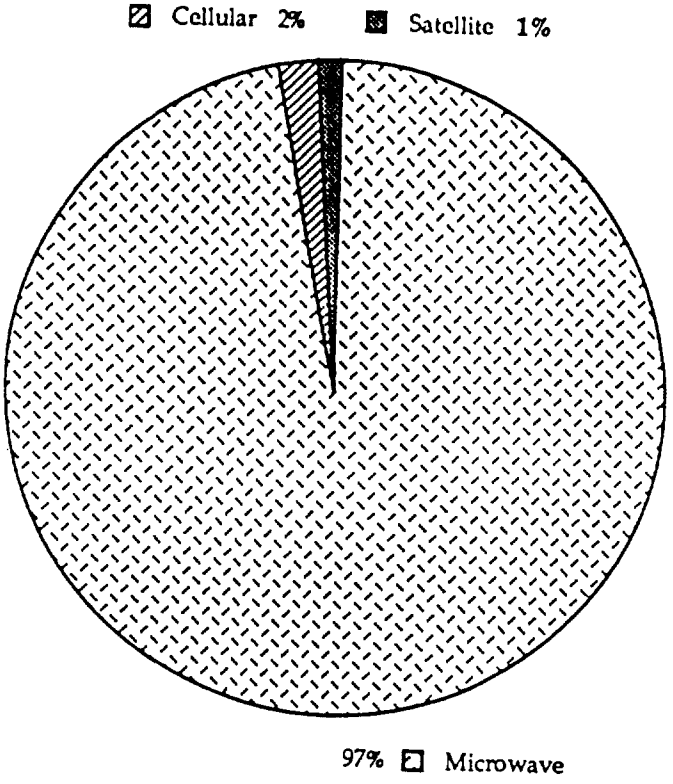
100% OF TRAFFIC (Approximately 150,000 Hours/Month; Microwave + Cellular + Satellite)



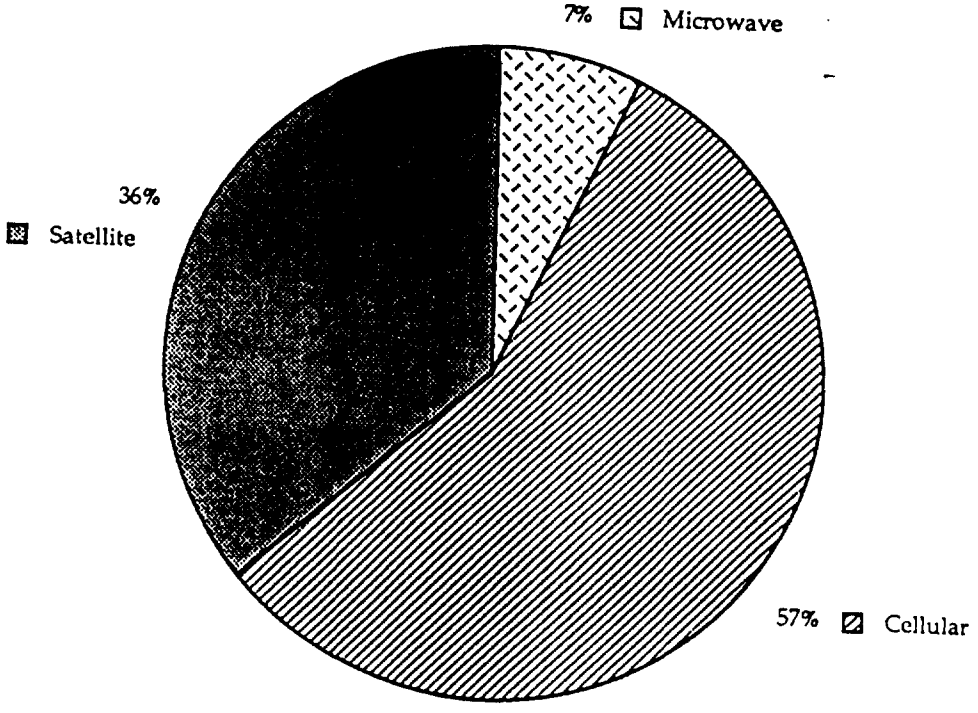
* 2-way radio not included in this analysis because of its (near) zero cost to the user and lack of air time logs. The service sector makes extensive use of 2-way radio. Select service companies make extensive use of private satellite systems.

** "Controlled" defined as selected and paid for by the producer (or service sector firm). For example, the producer may employ cellular systems for use on the mobile drilling rigs they hire.

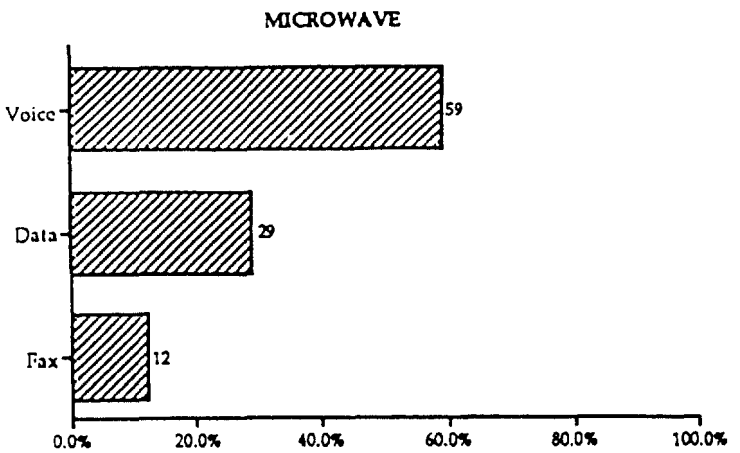
PRODUCER TRAFFIC
(93% of Total)

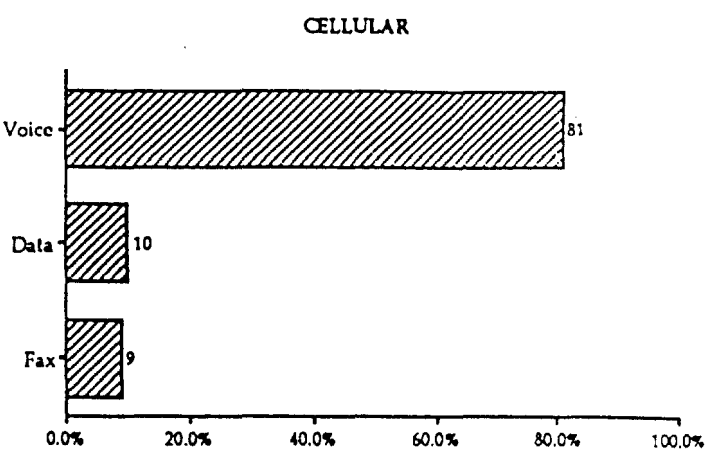


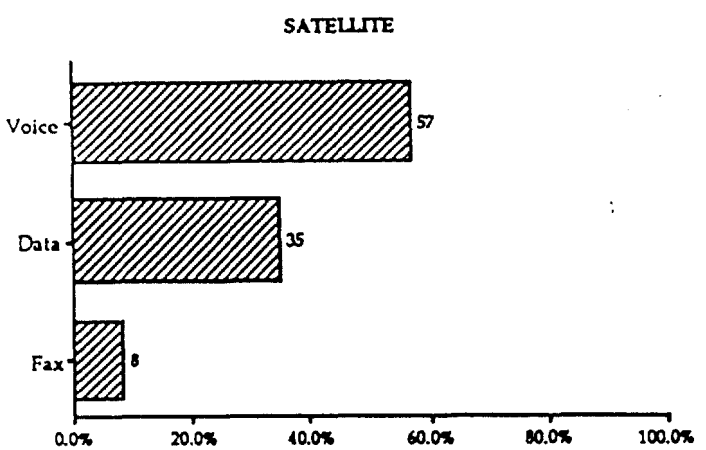
SERVICE SECTOR TRAFFIC
(7% of Total)

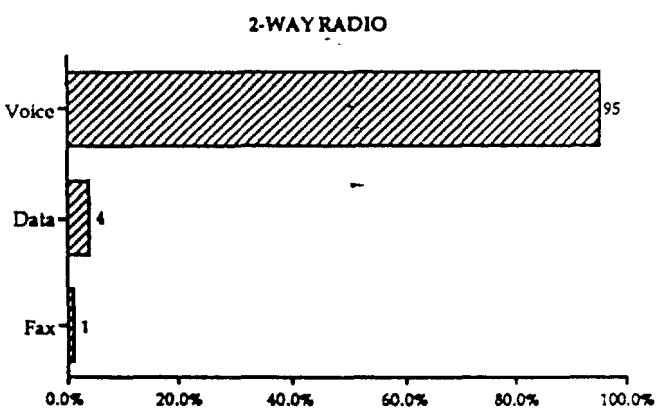


WHAT EACH TYPE COMMUNICATION SYSTEM IS USED FOR

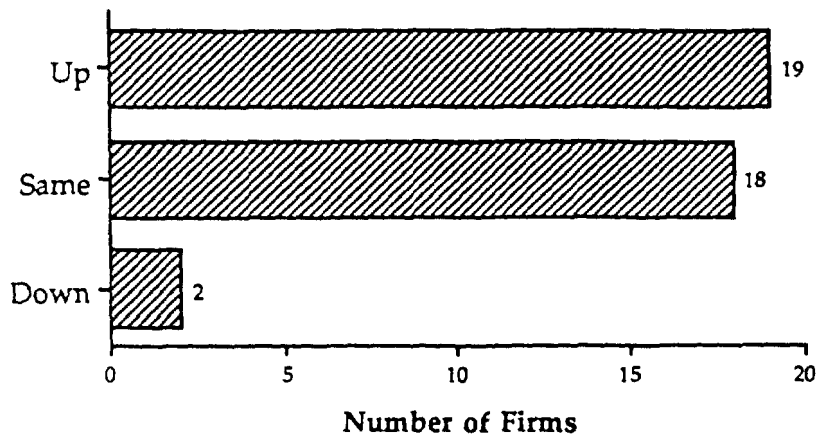








TREND IN COMMUNICATIONS TRAFFIC FOR NEXT TWO YEARS



SWITCHING COMMUNICATIONS METHODS

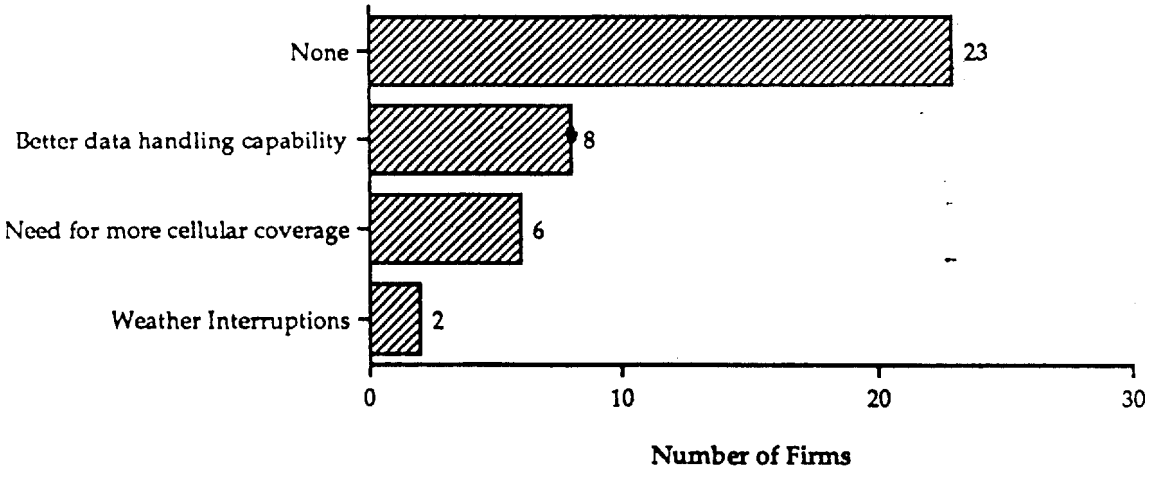
	Producers	Service Sector
	Number of Firms	
Microwave		
Switching toward	1	0
Same (No change)	9	1
Switching away from	4	2
TOTAL	14	3
Cellular		
Switching toward	6	12
Same (No change)	6	1
Switching away from	0	0
TOTAL	12	13
2-Way Radio		
Switching toward	0	0
Same (No change)	8	2
Switching away from	2	9
TOTAL	10	11

Note: 5 producers and 11 service sector firms see no change in future use of all their communications methods. (These answers are not included in numbers above.)

CELLULAR'S SCORE CARD

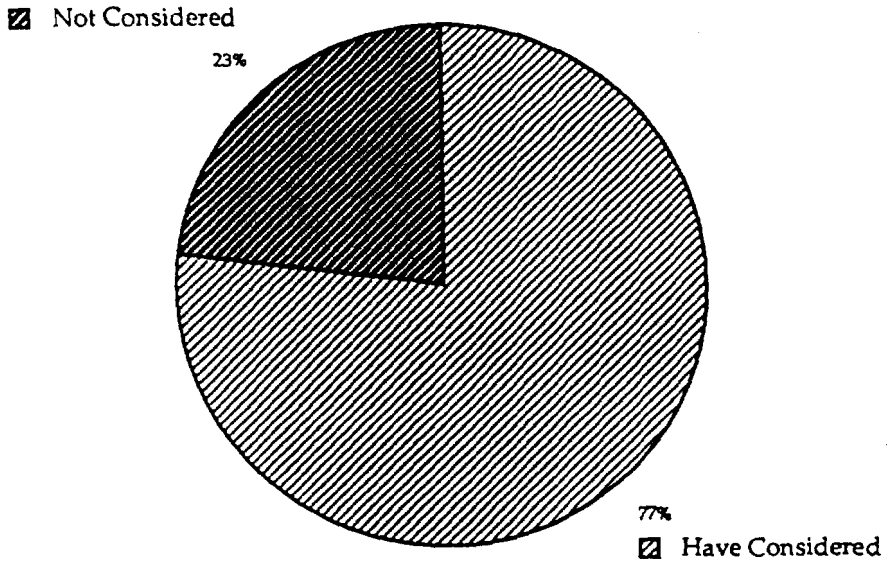
Factors	Cellular is: Better/Best	Good	Not as Good
	Number of firms		
Quality	20	10	2
Reliability	22	6	1
Flexibility	24	3	1
Cost	5	3	24
Availability when needed	12	4	0

UNMET COMMUNICATIONS NEEDS



CONSIDERATION OF CELLULAR FOR NEEDS NOW BEING SERVED BY MICROWAVE

WHAT PRODUCERS SAID



Conclusions:

Cost must come down	10
Depends on cost	1
Other answer	3

Note: Only four service sector firms responded to this question. Two have considered cellular and have reached favorable conclusions.

HOW MUCH VALUE CELLULAR USERS PLACE ON ITS EASY ACCESS TO THE PUBLIC TELEPHONE SYSTEM

	What Producers Said	What Service Sector Said
	Number of Firms	
Great Value	1	14
Moderate Value	2	1
Small Value	4	0
No Value	7	0
TOTAL	14	15

CELLULAR'S MOST IMPORTANT STRENGTHS/WEAKNESSES

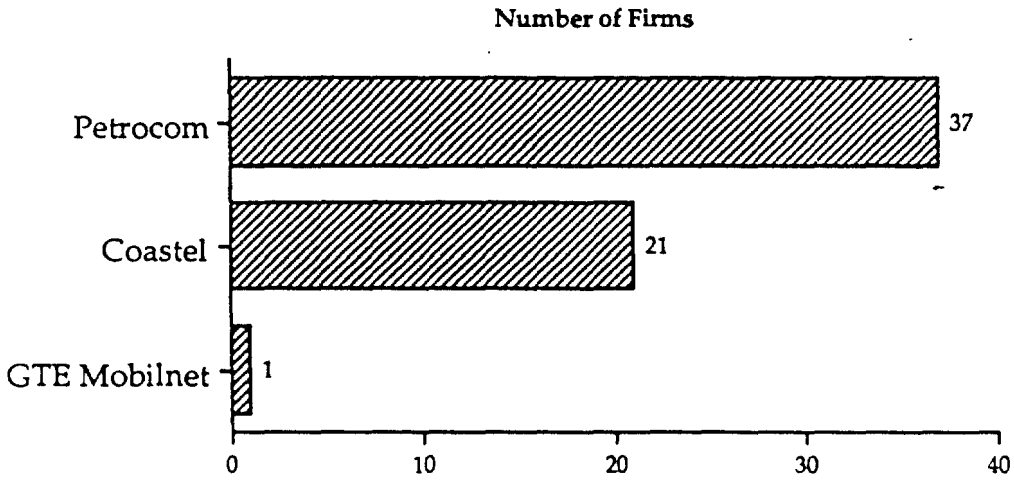
	Number of Mentions
STRENGTHS:	
Flexibility/Speed of installation	19
Mobility	12
Direct Contact/Privacy	10
Use on Remote Locations	4
WEAKNESSES/DISADVANTAGES:	-
Cost	20
Dead spots/Weak Cells/Limited Coverage	13
Inability to send sophisticated data	3

WHAT IT WOULD TAKE TO INCREASE USE OF CELLULAR SERVICE

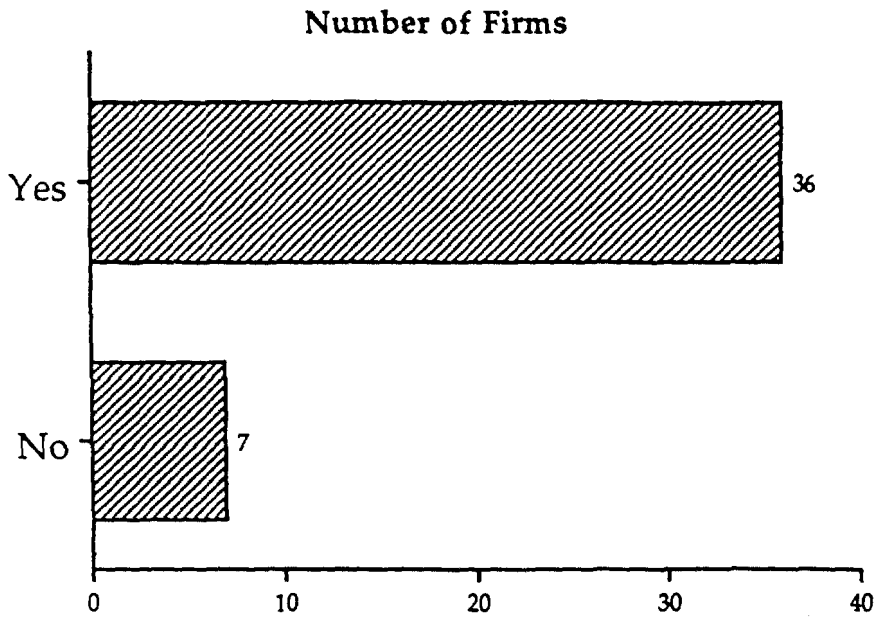
	What Producers Said	What Service Sector Said
	Number of Firms	
Lower the cost *	11	3
Improve capability for high speed data transmission	4	5
More study/experience (on our part)	2	3
Increase cell sites	1	2
More work (business)	0	3

* Including competitive "fixed" cost (flat fee).

AWARENESS OF COMPETITIVE CELLULAR SERVICE COMPANIES



HAVE BEEN CALLED ON BY PETROCOM SALESPERSON



PETROCOM'S SCORECARD

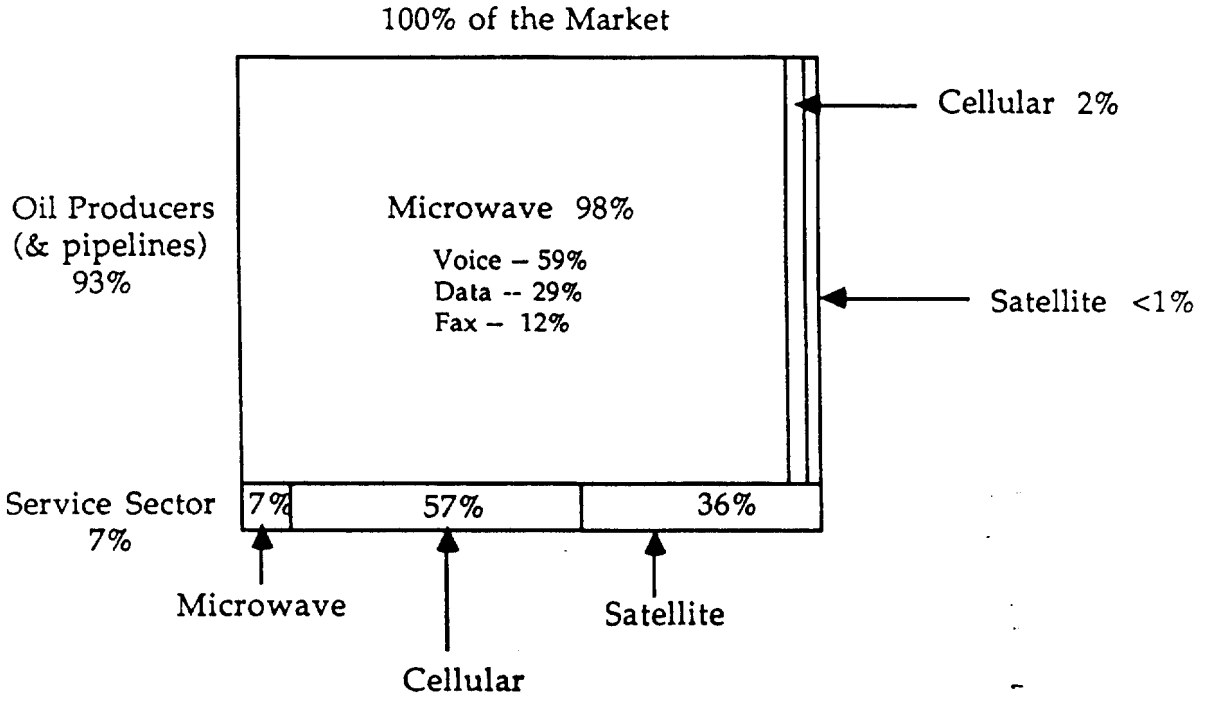
Factors	Excellent/Good	Satisfactory	Nuetral	Mixed	Negative/ Terrible
		Number of Firms			
Responsiveness	15	6	2	3	9
Quality of people	21	4	3	2	2
Selling Effort	9	7	4	2	1
Service Quality	13	5	7	1	1
Prices *	5	16	1	0	9
* (Producers answers)	(1)	(5)	(1)	(0)	(7)
(Service Sector answers)	(4)	(11)	(0)	(0)	(2)

Executive Summary

The Offshore Communications Market

The following diagram approximates the petroleum industry's offshore communications market as it exists today.

Approximately 150,000 Hours of Traffic/Month
(Not Including 2-Way Radio)



Since its inception to this date, cellular has penetrated approximately 5% of the communications market (--not counting 2-way radio usage--). This consists of 2% of the producer's market and 57% of the service sector's market.

While 18 out of 21 producers contacted in the survey make use of cellular service, many consider it only as a back-up or emergency means of communication. Typically the producer puts a cellular "phone" on their actual drilling rigs, and threatens the crew with dire consequences if it is used for anything but an emergency.

ATTACHMENT C

PetroCom Petition For Rulemaking In the Matter of Amendment of Part 90 of the Commission's rules to provide for interference protection for SMR licensees in the Gulf of Mexico (filed February 21, 1997).

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20054

In the Matter of	)
	)
Amendment of Part 90 of the	)
Commission's rules to provide	)
for interference protection	)
for SMR licensees in the	)
Gulf of Mexico	)

To: The Commission

PETITION FOR RULEMAKING

Petroleum Communications, Inc. ("PetroCom"), by its attorneys and pursuant to Section 1.401 of the Commission's rules, hereby petitions the Commission to amend Part 90 of its rules to provide for special co-channel separation distances for Specialized Mobile Radio ("SMR") systems licensed to operate in or near the Gulf of Mexico ("GOM"). In support of this Petition, the following is respectfully shown.

I. Statement of Interest

PetroCom is the licensee of SMR facilities on Upper 200 and Lower 80 channels at various sites in and near the GOM. PetroCom has invested substantial resources in deploying SMR services to oil industry customers whose operations take place in the GOM. PetroCom has dealt with a number of challenges in developing its SMR business, including an FCC application freeze and litigation over its request for a 6-month extension to build facilities on oil platforms in the offshore waters of the GOM. Notwithstanding the daunting nature of the logistical, environmental and regulatory challenges, PetroCom is committed to pursuing its SMR buildout plans. However, it is rightly concerned that the Commission's